UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,422	06/29/2001	Keiji Kanao	2635-60	5223

23117 7590 06/18/2003

NIXON & VANDERHYE, PC
1100 N GLEBE ROAD
8TH FLOOR
ARLINGTON, VA 22201-4714

EXAMINER
LEURIG, SHARLENE L

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/893,422	KANAO, KEIJI
	Examiner	Art Unit
	Sharlene Leurig	2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 April 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The Amendment to the Specification filed on April 24, 2003 has been entered and acknowledged by the Examiner.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2 and 7 stand rejected under 35 U.S.C. 103(a) as being obvious over Osamura et al. (6,094,000) in view of Abe et al. (6,215,234).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed

in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claim 1, Osamura discloses a spark plug with a tubular housing, a central bar electrode (Figure 2, element 3) inside the tubular housing (1) with electrical insulation (2) in between the two, a first bar discharge member (5) being arranged at one end of the central bar electrode, comprising Ir alloy (column 2, line 34), and protruding from one end of the tubular housing along an axis of the center electrode, a plate ground electrode (4) being arranged at one end of the tubular housing in a radial direction of the axis and having an end surface confronting a side surface of the first bar discharge member, and a second discharge member (6) being arranged on the end surface and having a surface confronting a side surface of the first bar discharge member. The side surface of the first bar discharge member that the ground electrode and the second discharge member confront is interpreted as being a side surface under the definition of side being "a surface forming part of the outside of an object". A spark discharge is generated at a gap between the first and second discharge members. The

width D of the side surface of the first bar discharge member in a normal direction of a plane including the radial direction and the axis (denoted by Osamura as "A") can be equal to or greater than 1.6 mm (column 2, line 47). The width A of the surface of the second discharge member confronting the first discharge member (denoted by Osamura as "C") can be as little as 0.3 mm less than the width D (compare the maxima of the ranges in column 2, lines 47 and 55). Therefore the difference between widths A and D, for example 0.3 mm, is equal to or lower than a result of adding 0.5 mm to G for any spark gap width, since the spark gap width must be positive.

Regarding claim 2, Osamura discloses a width D that is equal to or lower than 5.0 mm (column 2, line 47).

Regarding claim 7, Osamura discloses first and second discharge members comprising Ir and at least one of Rh, Pt, Ru, Pd and W (column 3, lines 29-31 and 66-67).

Osamura discloses a spark plug with all the limitations discussed above, including a spark gap, but is silent on the limitations of the spark gap width. However, Osamura discloses a goal of improving the lifetime of the spark plug.

Abe teaches a spark gap width of between 0.2 and 0.4 mm so that "the required voltage for producing sparks is relatively low" (column 2, line 15) in an effort to "secure the long life of the spark plug" (column 1, line 29).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Osamura's spark plug with a gap width within the range of 0.2 to 0.6 mm to attain a spark plug with an extended lifetime.

3. Claims 3 and 4 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Osamura et al. (6,094,000) in view of Abe et al. (6,215,234) as applied to claims 1, 2 and 7 above, and further in view of Yamaguchi et al. (4,700,103).

Osamura discloses a spark plug with all the limitations discussed above but lacks a specified spark gap width. Abe teaches a spark gap width of between 0.2-0.4 mm. Both Osamura and Abe lack a welding portion with a specified cross-sectional area, but Osamura discloses the use of laser welding to attach the first discharge member to the central electrode (column 2, line 60) and discloses a goal of increasing the lifetime of the spark plug.

Yamaguchi teaches a method of welding a first discharge member to the central electrode in order to form an enlarged flange to increase the welded joint area and consequently increase the joint strength in order to improve the durability and lifetime of the spark plug (column 2, lines 4-10). Yamaguchi teaches the welding of one end of the central electrode to a surface of the first bar discharge member on the sides of the central electrode (Fig. 4, interaction between elements 9 and 4). Yamaguchi's weld portion between the central electrode and the first discharge member has a cross-sectional area on a plane perpendicular to the axis equal to or lower than 8 mm^2. The weld portion has a diameter of 1.4 mm after welding, meaning it has a radius of 0.7 mm and a cross-sectional area equal to πr^2, which is equal to 1.54 mm^2 and less than 8 mm^2.

Therefore it would have been obvious to modify Osamura's spark plug with a specified spark gap width G and with welding spots on the sides of the central electrode

and with a weld portion having a cross-sectional area of equal to or less than 8 mm^2 in order to improve the lifetime of the spark plug.

4. Claims 5 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Osamura et al. (6,094,000) in view of Abe et al. (6,215,234) as applied to claims 1, 2 and 7 above, and further in view of Yamaguchi et al. (JP 9007734) (of record).

Osamura discloses a spark plug with all the limitations discussed above but lacks a specified spark gap width. Abe teaches a spark gap width of between 0.2-0.4 mm. Both Osamura and Abe lack a specified distance between the welding portion and the second discharge member, but Osamura discloses the use of laser welding to attach the first discharge member to the central electrode (column 2, line 60), a weld portion that does not confront the surface of the second discharge member (Fig. 2), and further discloses a goal of increasing the lifetime of the spark plug.

Yamaguchi teaches a distance between the weld portion and the second discharge member greater than the spark gap width G, and preferably greater than a result of adding 0.3 mm to G (paragraph 0017), which encompasses the claimed range of greater than the sum of G and 0.2 mm, in order to increase the lifetime of the spark plug by preventing discharge from reaching the welding joint (paragraph 0016).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Osamura's spark plug with a specified spark gap width G and a distance between the weld portion and the surface of the second discharge member greater than G by at least 0.2 mm in order to improve the lifetime of the spark plug.

R sponse to Arguments

5. Applicant's arguments filed on April 24, 2003 have been fully considered but they are not persuasive. The applicant has argued that the claimed invention, and specifically claims 1, 2 and 7, are patentable over the prior art of record, namely Osamura et al. (6,094,000) in view of Abe et al. (6,215,234) because the combination of the references does not satisfy the requirements for establishing a case of *prima facie* obviousness. The applicant has argued that neither Osamura nor Abe teaches a sparkplug comprising "a second discharge member arranged on an end surface of a ground electrode having a surface which confronts a side surface of a first discharge member arranged at an end of a central bar electrode" (page 4, lines 5-8).

The Examiner maintains that in Osamura the ground electrode and the second discharge member do confront a side surface of the first bar discharge member, "a side surface" being interpreted under the definition of "side" being "a surface forming part of the outside of an object". Therefore although the ground electrode and the second discharge member of Osamura do not confront vertical sides of the first bar discharge member, they do confront a side.

Furthermore, the applicant has argued that the claimed invention is patentable over the prior art of record because neither Osamura nor Abe teaches "|A-D| being equal or lower than a result of adding 0.5 mm to G, where G is the distance of the gap between first and second discharge members, D is the width of a side surface of the first discharge member in a normal direction of a plane including a radial direction of an axis of a center electrode connected to the first discharge member, and A is the width of

the surface of the second discharge member confronting the side surface of the first bar discharge member in the normal direction" (page 5, paragraph 3, line 4 to page 6, paragraph 1, line 4). However, the Examiner maintains that by following the definition of side stated above, "a surface forming part of the outside of an object", Osamura does disclose the dimensions above. Therefore all the claim limitations are met by Osamura in view of Abe and the case for *prima facie* obviousness has been met.

The applicant has argued that of the remaining claims, 3-4 are patentable over Osamura in view of Abe and further in view of Yamaguchi '103, and 5-6 are patentable over Osamura in view of Abe and further in view of Yamaguchi JP '734 since the claims depend on claim 1, which the applicant believed to be allowable. However, the rejection of these claims is maintained since the rejection of claim 1 is maintained, due to the reasoning discussed above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (703)305-4745. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703)305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

NIMESHKUMAR D. PATEL
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Sharlene Leurig
June 12, 2003